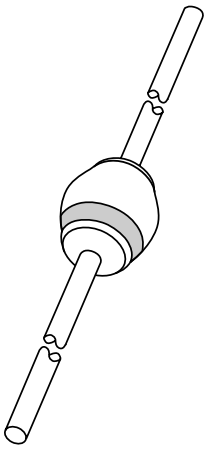
查询BZW03供应商



# DATA SHEET



# BZW03 series
## Voltage regulator diodes

Product specification
Supersedes data of April 1992

1996 May 14

Philips
Semiconductors

PHILIPS

# Voltage regulator diodes BZW03 series

## FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Zener working voltage range: 7.5 to 270 V for 38 types
- Transient suppressor stand-off voltage range: 6.2 to 430 V for 45 types
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

## DESCRIPTION

Rugged glass SOD64 package, using a high temperature alloyed construction. This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

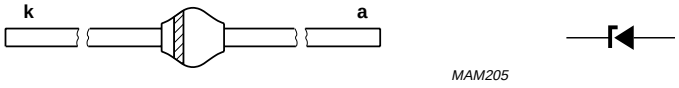



Fig.1 Simplified outline (SOD64) and symbol.

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $P_{tot}$ | total power dissipation | $T_{tp}$ = 25 °C; lead length 10 mm; see Fig.2 | – | 6.00 | W |
| | | $T_{amb}$ = 45 °C; see Fig.2; PCB mounted (see Fig.6) | – | 1.75 | W |
| $P_{ZRM}$ | repetitive peak reverse power dissipation | | – | 20 | W |
| $P_{ZSM}$ | non-repetitive peak reverse power dissipation | $t_p$ = 100 μs; square pulse; $T_j$ = 25 °C prior to surge; see Fig.3 | – | 1000 | W |
| $P_{RSM}$ | non-repetitive peak reverse power dissipation | 10/1000 μs exponential pulse (see Fig.7); $T_j$ = 25 °C prior to surge; see Fig.4 | – | 500 | W |
| $T_{stg}$ | storage temperature | | –65 | +175 | °C |
| $T_j$ | junction temperature | | –65 | +175 | °C |

## ELECTRICAL CHARACTERISTICS

### Total series

$T_j$ = 25 °C unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MAX. | UNIT |
|---|---|---|---|---|
| $V_F$ | forward voltage | $I_F$ = 1 A; see Fig.5 | 1.2 | V |

### Per type when used as voltage regulator diodes

$T_j$ = 25 °C unless otherwise specified.

| TYPE No. SUFFIX (1) | WORKING VOLTAGE | | | DIFFERENTIAL RESISTANCE | | TEMPERATURE COEFFICIENT | | TEST CURRENT | REVERSE CURRENT at REVERSE VOLTAGE | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $V_Z$ (V) at $I_Z$ | | | $r_{dif}$ (Ω) at $I_Z$ | | $S_Z$ (%/K) at $I_Z$ | | $I_Z$ (mA) | $I_R$ (μA) | at $V_R$ (V) |
| | MIN. | NOM. | MAX. | TYP. | MAX. | MIN. | MAX. | | MAX. | |
| C7V5 | 7.0 | 7.5 | 7.9 | 0.7 | 1.5 | 0.00 | 0.07 | 175 | 1500 | 5.6 |
| C8V2 | 7.7 | 8.2 | 8.7 | 0.8 | 1.5 | 0.03 | 0.08 | 150 | 1200 | 6.2 |
| C9V1 | 8.5 | 9.1 | 9.6 | 0.9 | 2.0 | 0.03 | 0.08 | 150 | 40 | 6.8 |
| C10 | 9.4 | 10 | 10.6 | 1.0 | 2.0 | 0.05 | 0.09 | 125 | 20 | 7.5 |
| C11 | 10.4 | 11 | 11.6 | 1.1 | 2.5 | 0.05 | 0.10 | 125 | 15 | 8.2 |
| C12 | 11.4 | 12 | 12.7 | 1.1 | 2.5 | 0.05 | 0.10 | 100 | 10 | 9.1 |
| C13 | 12.4 | 13 | 14.1 | 1.2 | 2.5 | 0.05 | 0.10 | 100 | 4 | 10 |
| C15 | 13.8 | 15 | 15.6 | 1.2 | 2.5 | 0.05 | 0.10 | 75 | 2 | 11 |
| C16 | 15.3 | 16 | 17.1 | 1.3 | 2.5 | 0.06 | 0.11 | 75 | 2 | 12 |
| C18 | 16.8 | 18 | 19.1 | 1.3 | 2.5 | 0.06 | 0.11 | 65 | 2 | 13 |
| C20 | 18.8 | 20 | 21.2 | 1.5 | 3.0 | 0.06 | 0.11 | 65 | 2 | 15 |
| C22 | 20.8 | 22 | 23.3 | 1.6 | 3.5 | 0.06 | 0.11 | 50 | 2 | 16 |
| C24 | 22.8 | 24 | 25.6 | 1.8 | 3.5 | 0.06 | 0.11 | 50 | 2 | 18 |
| C27 | 25.1 | 27 | 28.9 | 2.5 | 5 | 0.06 | 0.11 | 50 | 2 | 20 |
| C30 | 28 | 30 | 32 | 4 | 8 | 0.06 | 0.11 | 40 | 2 | 22 |
| C33 | 31 | 33 | 35 | 5 | 10 | 0.06 | 0.11 | 40 | 2 | 24 |
| C36 | 34 | 36 | 38 | 6 | 11 | 0.06 | 0.11 | 30 | 2 | 27 |
| C39 | 37 | 39 | 41 | 7 | 14 | 0.06 | 0.11 | 30 | 2 | 30 |
| C43 | 40 | 43 | 46 | 10 | 20 | 0.07 | 0.12 | 30 | 2 | 33 |
| C47 | 44 | 47 | 50 | 12 | 25 | 0.07 | 0.12 | 25 | 2 | 36 |
| C51 | 48 | 51 | 54 | 14 | 27 | 0.07 | 0.12 | 25 | 2 | 39 |
| C56 | 52 | 56 | 60 | 18 | 35 | 0.07 | 0.12 | 20 | 2 | 43 |
| C62 | 58 | 62 | 66 | 20 | 42 | 0.08 | 0.13 | 20 | 2 | 47 |
| C68 | 64 | 68 | 72 | 22 | 44 | 0.08 | 0.13 | 20 | 2 | 51 |
| C75 | 70 | 75 | 79 | 25 | 45 | 0.08 | 0.13 | 20 | 2 | 56 |
| C82 | 77 | 82 | 87 | 30 | 65 | 0.08 | 0.13 | 15 | 2 | 62 |
| C91 | 85 | 91 | 96 | 40 | 75 | 0.09 | 0.13 | 15 | 2 | 68 |

| TYPE No. SUFFIX (1) | WORKING VOLTAGE | | | DIFFERENTIAL RESISTANCE | | TEMPERATURE COEFFICIENT | | TEST CURRENT | REVERSE CURRENT at REVERSE VOLTAGE | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $V_Z$ (V) at $I_Z$ | | | $r_{dif}$ (Ω) at $I_Z$ | | $S_Z$ (%/K) at $I_Z$ | | $I_Z$ (mA) | $I_R$ (μA) | at $V_R$ (V) |
| | MIN. | NOM. | MAX. | TYP. | MAX. | MIN. | MAX. | | MAX. | |
| C100 | 94 | 100 | 106 | 45 | 90 | 0.09 | 0.13 | 12 | 2 | 75 |
| C110 | 104 | 110 | 116 | 65 | 125 | 0.09 | 0.13 | 12 | 2 | 82 |
| C120 | 114 | 120 | 127 | 90 | 170 | 0.09 | 0.13 | 10 | 2 | 91 |
| C130 | 124 | 130 | 141 | 100 | 190 | 0.09 | 0.13 | 10 | 2 | 100 |
| C150 | 138 | 150 | 156 | 150 | 330 | 0.09 | 0.13 | 8 | 2 | 110 |
| C160 | 153 | 160 | 171 | 180 | 350 | 0.09 | 0.13 | 8 | 2 | 120 |
| C180 | 168 | 180 | 191 | 210 | 430 | 0.09 | 0.13 | 5 | 2 | 130 |
| C200 | 188 | 200 | 212 | 250 | 500 | 0.09 | 0.13 | 5 | 2 | 150 |
| C220 | 208 | 220 | 233 | 350 | 700 | 0.09 | 0.13 | 5 | 2 | 160 |
| C240 | 228 | 240 | 256 | 450 | 900 | 0.09 | 0.13 | 5 | 2 | 180 |
| C270 | 251 | 270 | 289 | 600 | 1200 | 0.09 | 0.13 | 5 | 2 | 200 |

**Note**

1. To complete the type number the suffix is added to the basic type number, e.g. BZW03-C100.

**Per type when used as transient suppressor diodes**

$T_j$ = 25 °C unless otherwise specified.

| TYPE NUMBER | REVERSE BREAKDOWN VOLTAGE | TEMPERATURE COEFFICIENT | | TEST CURRENT | CLAMPING VOLTAGE | | REVERSE CURRENT at STAND-OFF VOLTAGE | |
|---|---|---|---|---|---|---|---|---|
| | $V_{(BR)R}$ (V) at $I_{test}$ | $S_Z$ (%/K) at $I_{test}$ | | $I_{test}$ (mA) | $V_{(CL)R}$ (V) | at $I_{RSM}$ (A) note 1 | $I_R$ (μA) | at $V_R$ (V) |
| | MIN. | MIN. | MAX. | | MAX. | | MAX. | |
| BZW03-C7V5 | 7.0 | 0.00 | 0.07 | 175 | 11.3 | 44.2 | 3000 | 6.2 |
| BZW03-C8V2 | 7.7 | 0.03 | 0.08 | 150 | 12.3 | 40.6 | 2400 | 6.8 |
| BZW03-C9V1 | 8.5 | 0.03 | 0.08 | 150 | 13.3 | 37.6 | 100 | 7.5 |
| BZW03-C10 | 9.4 | 0.05 | 0.09 | 125 | 14.8 | 34.0 | 40 | 8.2 |
| BZW03-C11 | 10.4 | 0.05 | 0.10 | 125 | 15.7 | 31.8 | 30 | 9.1 |
| BZW03-C12 | 11.4 | 0.05 | 0.10 | 100 | 17.0 | 29.4 | 20 | 10 |
| BZW03-C13 | 12.4 | 0.05 | 0.10 | 100 | 18.9 | 26.4 | 10 | 11 |
| BZW03-C15 | 13.8 | 0.05 | 0.10 | 75 | 20.9 | 23.9 | 10 | 12 |
| BZW03-C16 | 15.3 | 0.06 | 0.11 | 75 | 22.9 | 21.8 | 10 | 13 |
| BZW03-C18 | 16.8 | 0.06 | 0.11 | 65 | 25.6 | 19.5 | 10 | 15 |
| BZW03-C20 | 18.8 | 0.06 | 0.11 | 65 | 28.4 | 17.6 | 10 | 16 |
| BZW03-C22 | 20.8 | 0.06 | 0.11 | 50 | 31.0 | 16.1 | 10 | 18 |
| BZW03-C24 | 22.8 | 0.06 | 0.11 | 50 | 33.8 | 14.8 | 10 | 20 |
| BZW03-C27 | 25.1 | 0.06 | 0.11 | 50 | 38.1 | 13.1 | 10 | 22 |
| BZW03-C30 | 28 | 0.06 | 0.11 | 40 | 42.2 | 11.8 | 10 | 24 |
| BZW03-C33 | 31 | 0.06 | 0.11 | 40 | 46.2 | 10.8 | 10 | 27 |
| BZW03-C36 | 34 | 0.06 | 0.11 | 30 | 50.1 | 10.0 | 10 | 30 |
| BZW03-C39 | 37 | 0.06 | 0.11 | 30 | 54.1 | 9.2 | 10 | 33 |
| BZW03-C43 | 40 | 0.07 | 0.12 | 30 | 60.7 | 8.2 | 10 | 36 |
| BZW03-C47 | 44 | 0.07 | 0.12 | 25 | 65.5 | 7.6 | 10 | 39 |
| BZW03-C51 | 48 | 0.07 | 0.12 | 25 | 70.8 | 7.0 | 10 | 43 |
| BZW03-C56 | 52 | 0.07 | 0.12 | 20 | 78.6 | 6.3 | 10 | 47 |
| BZW03-C62 | 58 | 0.08 | 0.13 | 20 | 86.5 | 5.8 | 10 | 51 |
| BZW03-C68 | 64 | 0.08 | 0.13 | 20 | 94.4 | 5.3 | 10 | 56 |
| BZW03-C75 | 70 | 0.08 | 0.13 | 20 | 103.5 | 4.8 | 10 | 62 |
| BZW03-C82 | 77 | 0.08 | 0.13 | 15 | 114.0 | 4.3 | 10 | 68 |
| BZW03-C91 | 85 | 0.09 | 0.13 | 15 | 126 | 3.9 | 10 | 75 |
| BZW03-C100 | 94 | 0.09 | 0.13 | 12 | 139 | 3.6 | 10 | 82 |
| BZW03-C110 | 104 | 0.09 | 0.13 | 12 | 152 | 3.3 | 10 | 91 |
| BZW03-C120 | 114 | 0.09 | 0.13 | 10 | 167 | 3.0 | 10 | 100 |
| BZW03-C130 | 124 | 0.09 | 0.13 | 10 | 185 | 2.7 | 10 | 110 |
| BZW03-C150 | 138 | 0.09 | 0.13 | 8 | 204 | 2.4 | 10 | 120 |
| BZW03-C160 | 153 | 0.09 | 0.13 | 8 | 224 | 2.2 | 10 | 130 |

| TYPE NUMBER | REVERSE BREAKDOWN VOLTAGE | TEMPERATURE COEFFICIENT | | TEST CURRENT | CLAMPING VOLTAGE | | REVERSE CURRENT at STAND-OFF VOLTAGE | |
|---|---|---|---|---|---|---|---|---|
| | $V_{(BR)R}$ (V) at $I_{test}$ | $S_Z$ (%/K) at $I_{test}$ | | $I_{test}$ (mA) | $V_{(CL)R}$ (V) | at $I_{RSM}$ (A) note 1 | $I_R$ (μA) | at $V_R$ (V) |
| | MIN. | MIN. | MAX. | | MAX. | | MAX. | |
| BZW03-C180 | 168 | 0.09 | 0.13 | 5 | 249 | 2.0 | 10 | 150 |
| BZW03-C200 | 188 | 0.09 | 0.13 | 5 | 276 | 1.8 | 10 | 160 |
| BZW03-C220 | 208 | 0.09 | 0.13 | 5 | 305 | 1.6 | 10 | 180 |
| BZW03-C240 | 228 | 0.09 | 0.13 | 5 | 336 | 1.5 | 10 | 200 |
| BZW03-C270 | 251 | 0.09 | 0.13 | 5 | 380 | 1.3 | 10 | 220 |
| BZW03-C300 | 280 | 0.09 | 0.13 | 5 | 419 | 1.2 | 10 | 240 |
| BZW03-C330 | 310 | 0.09 | 0.13 | 5 | 459 | 1.1 | 10 | 270 |
| BZW03-C360 | 340 | 0.09 | 0.13 | 5 | 498 | 1.0 | 10 | 300 |
| BZW03-C390 | 370 | 0.09 | 0.13 | 5 | 537 | 0.93 | 10 | 330 |
| BZW03-C430 | 400 | 0.09 | 0.13 | 5 | 603 | 0.83 | 10 | 360 |
| BZW03-C470 | 440 | 0.09 | 0.13 | 5 | 655 | 0.76 | 10 | 390 |
| BZW03-C510 | 480 | 0.09 | 0.13 | 5 | 707 | 0.71 | 10 | 430 |

**Note**

1. Non-repetitive peak reverse current in accordance with *"IEC 60-1, Section 8"* (10/1000 μs pulse); see Fig.7.

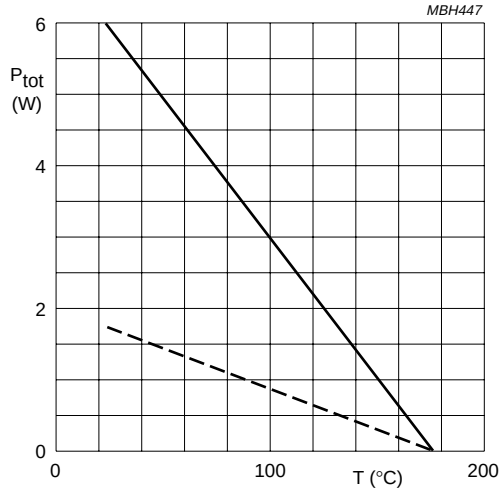
**THERMAL CHARACTERISTICS**

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---|---|---|---|---|
| $R_{th\ j\text{-}tp}$ | thermal resistance from junction to tie-point | lead length = 10 mm | 25 | K/W |
| $R_{th\ j\text{-}a}$ | thermal resistance from junction to ambient | note 1 | 75 | K/W |

**Note**

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.6. For more information please refer to the *"General Part of associated Handbook"*.

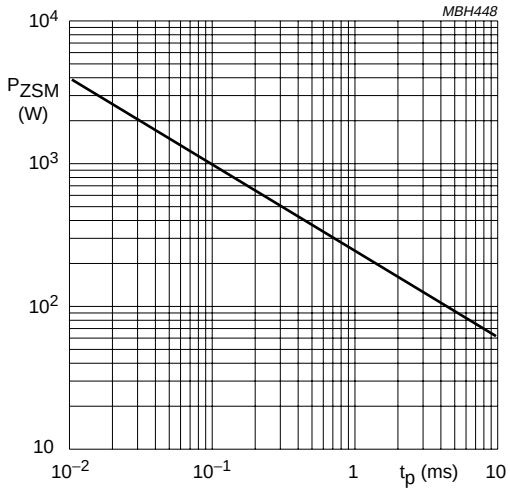
## GRAPHICAL DATA




Solid line: tie-point temperature; lead length = 10 mm.

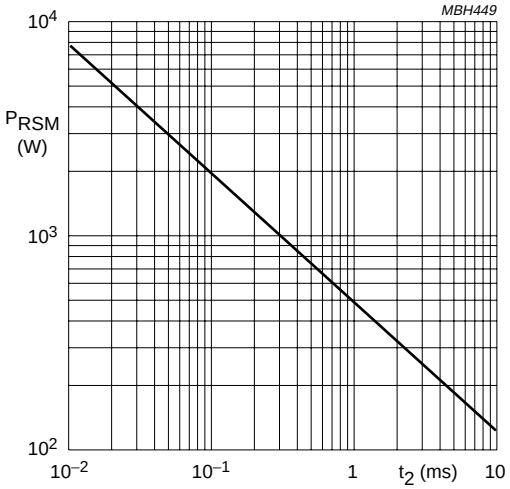
Dotted line: ambient temperature; device mounted as shown in Fig.6.

Fig.2 Maximum total power dissipation as a function of temperature.




$T_j$ = 25 °C prior to surge.

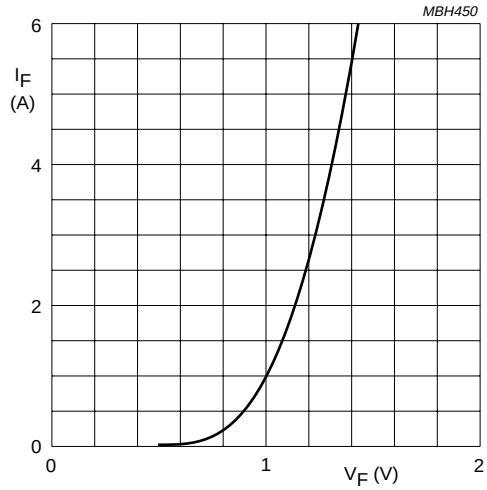
Fig.3 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).




$T_j$ = 25 °C prior to surge.

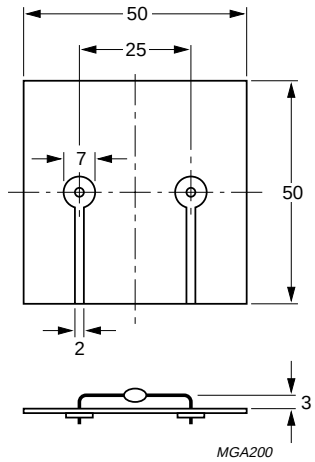
For definition of exponential pulse see Fig.7.

Fig.4 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (exponential pulse).



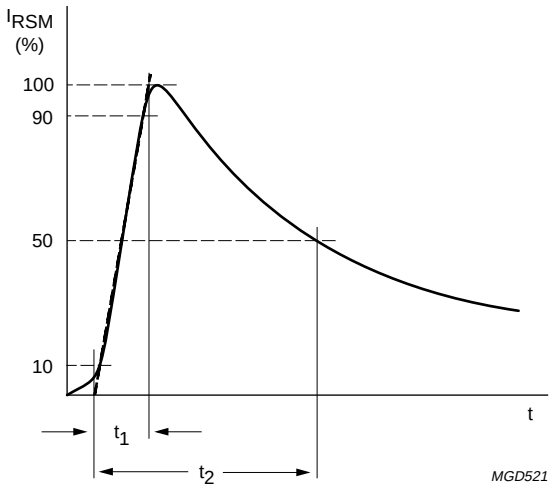

$T_j$ = 25 °C.

Fig.5 Forward current as a function of forward voltage; typical values.




Dimensions in mm.

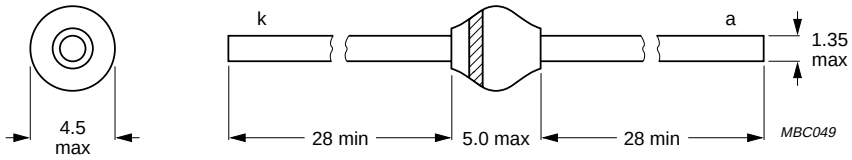
Fig.6 Device mounted on a printed-circuit board.




In accordance with *"IEC 60-1, Section 8"*.
$t_1$ = 10 μs.
$t_2$ = 1000 μs.

Fig.7 Non-repetitive peak reverse current pulse definition.

## PACKAGE OUTLINE




Dimensions in mm.

The marking band indicates the cathode.

Fig.8 SOD64.

## DEFINITIONS

| **Data sheet status** | |
|---|---|
| Objective specification | This data sheet contains target or goal specifications for product development. |
| Preliminary specification | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification | This data sheet contains final product specifications. |
| **Limiting values** | |
| Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability. | |
| **Application information** | |
| Where application information is given, it is advisory and does not form part of the specification. | |

## LIFE SUPPORT APPLICATIONS

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